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The Pilot Questionnaire Study on the 1987 General Moose Season

By Soprovich, Daniel W. and Brad C. Johnson. 1989.

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ABSTRACT

A pilot study was conducted to examine the effect of several response induction techniques on response rate to a questionnaire sent to general moose hunters. The impact of the pilot method on estimation of kill rate was documented, as were time and cost requirements for implementation. Kill rate estimates and time and cost requirements were compared for the pilot and standard methods. Kill rate estimates from the pilot method were compared at response rates of 46.0% (mean response for 1981-1985) and 86.0% (maximum attainable response).

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INTRODUCTION

Harvest and other statistics have been estimated for the general moose season via the mailed questionnaire technique since 1963 (Bossenmaier and MacPherson 1964). During recent years, this method has consisted of one mailing of a questionnaire approximately 1-2 months after the season has ended. The response rate has been <50% for 1981 and subsequent years. Harvest has been estimated by assuming that respondents were representative of non-respondents. Unfortunately, this assumption has been shown to be incorrect by a number of studies (MacDonald and Dillman 1968; McPhillips et al. 1985; Grauvogal 1987) for white-tailed deer (Odocoileus virginianus) and moose (Alces alces). The consequence of this non-response bias is that kill rate (kills per license) and harvest are overestimated by this method.

In Manitoba, Bossenmaier and MacPherson (1964) found that harvest estimates were grossly overestimated due to a low response rate (21.3%) when questionnaires were attached to the moose licence. Harvest data from roadside check stations led V. Crichton (Manitoba Wildlife Branch, pers. commun.) to believe that questionnaire-generated estimates for Game Hunting Area 26 were highly inaccurate. Concern over the accuracy of the estimates and recognition that non-response bias could be the cause led Soprovich (1989) to examine the questionnaire-generated statistics for the general moose season. It was estimated that the technique overestimated harvest by 15.2% for the early season, 43.0% for the late season, 23.7% for both seasons combined, and 64.4% for Game Hunting Area 26.

The ability of the non-respondent group to influence the accuracy of a statistic declines as response rate approaches 100%. This is so because the difference between respondents and non-respondents, if one exists at high response rates, would have to be very large to affect the statistic substantially. One method of dealing with this source of error, therefore, is to minimize its impact by utilizing response induction techniques (Filion 1978, 1980) to maximize response rate. The objective of this study was to assess the impact of several such techniques (i.e., multiple mailings and registered mail) on response rate and the resultant statistics and to enhance response to a level at which non-response bias would be negligible.

METHODS

The standard method of harvest estimation was conducted to provide an estimate consistent with past estimates for management purposes. For this standard estimate, a systematic sample was drawn at a sampling intensity of 50% (every second stub) and a questionnaire sent to each individual in this sample. License stubs must first be received by vendors and are then processed by Wildlife and Fisheries Licensing prior to being sent to Wildlife Branch for sampling purposes. As a consequence, questionnaires are sent out in groups as stubs become available for sampling.

For this pilot study, the stubs remaining after sampling for the standard estimates were systematically sampled at every sixth stub. This sampling methodology resulted in a sampling intensity of 1 per 12 stubs or 8.3%. The names and addresses from this sample were entered into a computer, name and address labels generated, and the first mailing sent on 29 January 1988. The second mailing was conducted 25 days after the first mailing (23 February) with subsequent mailings at approximate 2 week intervals (9 March, 23 March, 8 April). The fifth mailing was sent by registered mail with an orange label which read "IMPORTANT: Please answer and return even if you did not hunt or tag a moose" affixed to each questionnaire. Appendix I contains a sample of the questionnaire used. For the purpose of this pilot study, a wave (group of questionnaires) began when the first questionnaire from a new mailing was received and included all subsequent questionnaires received prior to the beginning of the next wave (i.e., prior to the day on which the first questionnaire from the next mailing was received).

RESULTS

Sampling frame

The sampling frame included 85.7% of the general moose licenses for the pilot study and 94.2% for the standard method (Table 1). Inaccurate records suggest that the sampling frame for the standard method may have been as high as 95.2% of total licenses (first 5600). The sampling frame

was less complete for the pilot study because the date of the first mailing was set in an attempt to provide timely estimates (i.e., 15 March as suggested by R. Larche, Manitoba Wildlife Branch, pers. commun.). License stubs received after the date of the first mailing were not sampled for the pilot study. Some license stubs were received too late for the standard method and are not included in the sampling frame for that method.

Table 1. Sampling frames for the standard and pilot questionnaire estimates.

Estimate	Total number of licenses[a]	Sampling frame (licenses)	Proportion of licenses in sampling frame
Standard	5,882	First 5,541(?)	.942(?)
Pilot	5,882	First 5,040	.857

[a]Total licenses at 30 April 1988 (D. Tuck, Manitoba Department of Natural Resources, pers. commun.).

Time requirements

The time requirements for implementation of the pilot program do not include software development (Table 2).

Table 2. Time requirements for harvest estimation via the pilot method.

Task	Time (minutes)
Affix stubs to sheets of paper, input and edit names and addresses (by word processor operator)	285
Sample frame	Approximately the same for pilot and standard
Affix labels to questionnaires (1,214 questionnaires for mailings I-V)	164
Affix orange labels to questionnaires sent by registered mail (143 questionnaires)	15
Fill out registration receipts and check postal codes (registered mail only)	135
Enter data into computer which includes time required to enter duplicates, for software to determine if a record is unique, editing time, and adjustment of ambiguous data (based on first 275 records entered).	Estimated at 209 for the 361 unique records (based on .58 minutes/unique record)

Cost requirements

Questionnaire printing and postal costs are provided in Table 3 for the 1987 estimates of harvest for the general moose season.

Table 3. Fixed costs of questionnaire-generated harvest estimates for 1987.

Detail	Cost
Print questionnaires	$162.21 per thousand
Postage (send questionnaires out)	$ 0.20 per questionnaire
Postage (receive questionnaires)	$ 0.413 per questionnaire
Postage (send questionnaires via registered mail)	$ 3.07 per questionnaire

The estimated cost of the standard method was $1.15 per record and $1,582.07 in total (Table 4). This cost was estimated because it appears that more questionnaires (128 was the estimated number) were sent out than is indicated in the estimates for the standard method (Appendix II). An estimate of 2,800 questionnaires was used to calculate the cost of the standard method.

Table 4. Estimated cost of standard method based on a sample size of 2,800 with a return of 1,375 questionnaires. Fixed costs from Table 3 used to calculate costs.

Detail	Cost
Print questionnaires	$ 454.19
Postage (send questionnaires out)	$ 560.00
Postage (receive responses)	$ 567.88
Total cost	$1,582.07
Cost per record	$ 1.15

The cost of the pilot program was $2.81 per record and $1,014.50 in total (Table 5). The cost of the pilot program was greater on a per record basis but only 64%, in total, of the cost of the standard method.

Table 5. Cost of the pilot method based on printing 1,214 questionnaires (mailings I-IV), postage for 143 questionnaires (mailing V), and postage for 398 responses (includes duplicates). Fixed costs from Table 3 used to calculate costs.

Detail	Cost
Print questionnaires	$ 196.92
Postage (send questionnaires out, mailings I-IV)	$ 214.20
Postage (send questionnaires out, mailing V)	$ 439.01
Postage (receive responses)	$ 164.37
Total Cost	$1,014.50
Cost per record	$ 2.81

The additional cost required to induce response was estimated for each subsequent mailing (Table 6). The cost of postage for duplicate responses was not included in the analysis. The similar cost per record after 5 mailings ($2.77 versus $2.81) indicates that this omission would have little influence on the comparison of mailings.

The cumulative cost per record is maximized in the above analysis because further questionnaires would be received if any given mailing, with the exception of mailing V, represented the last mailing (for example, if only mailing I had been conducted, the cumulative cost per record would be expected to approximate the $1.15 per record found for the standard method). The cost per record increased with each mailing. The records which resulted from the registered mailing were very expensive ($6.26 per record) and increased the cumulative cost per record by 55% (from $1.79 to $2.77). The cumulative cost per record for 3 mailings was 44% greater than that for the

Table 6. Additional cost, by mailing, required to induce response.

Mailing	No. of questionnaires mailed	Cost of mailing (printing & postage)	No. of responses[a]	Cost of responses (postage)	Total Cost	Cost per record	Cumulative cost per record
I	420	$152.13	168	$69.38	$221.51	$1.32	$1.32
II	267	$ 96.71	55	$22.72	$119.43	$2.17	$1.53
III	222	$ 80.41	40	$16.52	$ 96.93	$2.42	$1.66
IV	162	$ 58.68	19	$ 7.85	$ 66.47	$3.50	$1.79
V	143	$462.21	79	$32.63	$494.84	$6.26	$2.79

[a]The number of responses in each wave was used to estimate response to a mailing.

standard method ($1.66 versus $1.15); however, this cost would decrease somewhat if only 3 mailings were conducted (as additional records would likely be received).

Response rate and kill rate

Three mailings were effective in increasing response rate to 62.6% (Table 7) but the fourth mailing had little impact on response rate (67.1%). The fifth mailing (registered mail) increased response rate by almost 20% to 86.0% (Table 7, Fig. 1). These response rates were calculated using the total sample of 420 licensees for the denominator. Fifteen questionnaires were returned by Canada Post Corporation marked "Moved, address unknown." One method of treating non-deliverables is to exclude them from the sample because the individuals do not have an opportunity to respond to the questionnaire. The assumption is then made that the kill rate from the non-deliverable group is the same as that for respondents. The response rate was 89.1% (405 for the denominator) when non-deliverables were treated in this manner. For the purposes of this study, non-deliverables were included in the sample.

Table 7. Influence of multiple mailing on response and success rates.

Waves	No. of responses	Response rate(%) (n=420)	No. of kills	Kill rate(%)
I	168	40.0	33	19.6
I & II	223	53.1	39	17.5
I & II & III	263	62.6	43	16.3
I & II & III & IV	282	67.1	47	16.7
I & II & III & IV & V	361	86.0	59	16.3

The kill rate decreased from 19.6% at a response rate of 40.0% to 16.3% at a response rate of 62.6% and appeared to have stabilized by this level of response (Table 7, Fig. 1). The kill rate for the first 3 waves (62.6% of sample) was not different ($P > z = 0.99$) from that for the last 2 waves (23.4% of sample). Appendix II contains detailed results compiled following successive waves.

Comparison at mean response rate and to standard method

The kill rate for the pilot method was 18.7% at a response rate of 46% (the mean response rate for 1981-1985). Although 14.1% greater than the estimate at a response rate of 86.0% (i.e., a kill rate of 16.3%), 18.7% is well within the 95% confidence interval (12.6%, 20.2%) of this estimate (note that samples are not independent).

The results of the standard questionnaire survey are contained in Appendix III. The estimated kill rate (both seasons) from the standard method (17.7%) was not different ($P > z = 0.58$) from that obtained at an 86.0% response rate for the pilot method. Winter harvest, as estimated by the standard method, was 20% greater than the estimate generated by the pilot method.

DISCUSSION

Sampling frame

The sampling frame was more complete for the standard method than for the pilot method. It is possible that early stubs were sampled at a

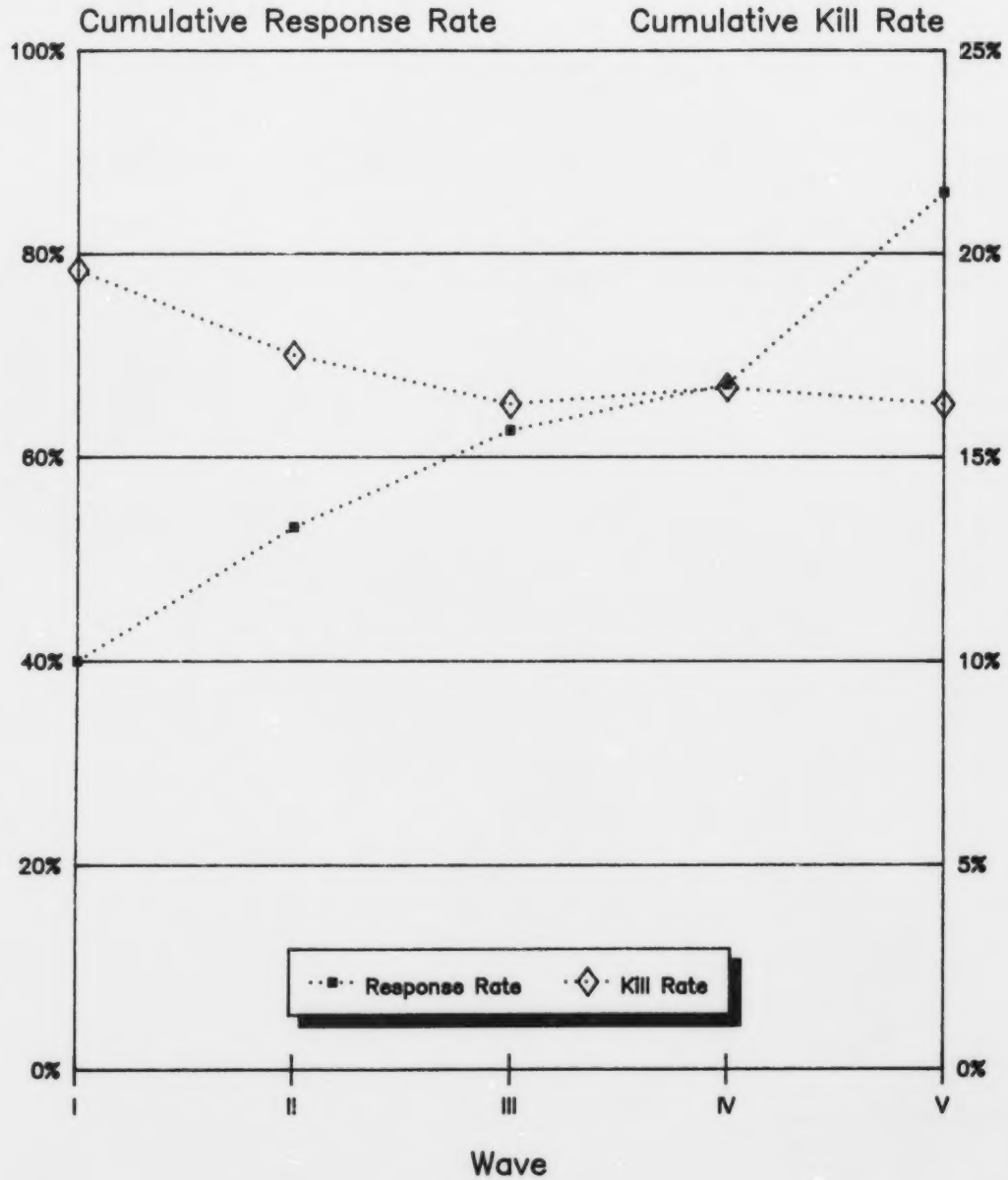

Fig. 1. The influence of multiple mailing and registered mail on response rate and kill rate.

rate >50% (54%?) for the standard method. The sampling frame would have been <95% under such circumstances. The difference in sampling frame could be important because licensees from late-received stubs generally have a lower kill rate, hunt proportionately more during the late season, and have proportionately more of their harvest from the late season than licensees from early-received stubs (Soprovich 1989).

Time requirements

An objective of this study was to compare time requirements of the pilot and standard methods; however, data were not available for the standard method. Although hard data are not available for the standard method, the following points can be made respecting the two methods:

(i) It is faster to affix license stubs (as opposed to labels for the pilot method) to questionnaires for the standard method on a per license basis. The task would have taken longer; however, for the standard method because of the greater number of questionnaires sent out for this method.

(ii) Slightly more editing time is required for the pilot method because records must be edited prior to each mailing.

(iii) Entering and processing duplicates did not influence time requirements substantially because few records (9%) were duplicates.

(iv) Input time for the standard method would have been considerably greater because substantially more questionnaires were input.

It is believed that total time requirements would have been similar for the two methods.

Cost requirements

The cost of the pilot method was considerably less than that of the standard method. The cost per record increased with each mailing for the pilot method until the registered mailing increased this by almost $1.00 per record. This substantial increase was due to the high cost per additional record for the registered mailing. The total cost of estimating harvest would have been considerably lower than the standard method if the registered mailing had not been conducted (eg., approximately $434.87 and

<$1.66 per record for 3 mailings).

Response rate and kill rate

It was possible to obtain response rates of 62.6%, 67.1%, and 86.0% after 3, 4, and 5 mailings, respectively, when the fifth mailing was by registered mail. The response rates for 3 and 4 mailings were minimal estimates because further responses would have been received if a subsequent mailing had not been conducted. A response rate of 58.9% was achieved with 2 mailings for 1986 while response rates to 1 mailing were <50% for 1981-1986 (Soprovich 1989). The response rate for the standard method was estimated at 51.0% for 1987; however, it is likely that this rate was overestimated due to inaccurate records. It is apparent that more than 1 mailing increases response rate significantly (this study and Soprovich 1989); however, the advantage of an additional mailing beyond two is not clear. The response rate achieved in 1986 by 2 mailings was similar to that in 1987 by 3 mailings. Again, the response rate to 3 mailings for 1987 is an estimate and would have been somewhat higher if a fourth mailing had not been conducted. The third mailing might have increased response by approximately 10% (62.6% for 3 waves versus 53.1% for 2 waves) for this sample of licensees; however, it is likely that the increase in response would have been somewhat less if these number of mailings had actually been conducted (i.e., a total number of mailings of 2 versus 3).

The response rates for 3 and 4 mailings do not compare well to response rates from some other areas. A response rate of 70-85% is achieved for a centrally-conducted survey of moose hunters in Ontario (3-4 mailings) while a survey conducted at a district level achieved a mean response rate of 84.2% for 2 mailings (Gollat and Timmermann 1987). A response rate of approximately 70% is achieved for 3 mailings in the Yukon (Kale 1982). The relatively poor response rates achieved in Manitoba may result simply from the small sample and random variation or may reflect differences between hunters from Manitoba and other areas (eg., perhaps as related to a lower kill rate; the estimated kill rate for Ontario was 18.4% for 1986). The substantial increase in response rate as the result of the registered mailing suggests that, at least for the sample of hunters surveyed by the pilot method, considerable resistance to respond exists. Further, this

resistance did not appear to relate to success because the success rate of the last 2 waves was actually higher than that of the previous 3 waves (because kill rate was the same and 93.5% of the respondents from waves I-III hunted as compared to 81.6% from waves IV-V).

Kill rate decreased with the addition of subsequent waves until a response rate of 62.6% (waves I-III) had been achieved. This result is consistent with that of Soprovich (1989) for the 1986 general moose season (from a response rate of 46.4% to 58.9%). Similarly, Barbowski (1972) provides data from Ontario which suggests that kill rate (success rate (undefined) is the statistic used by Barbowski 1972) would generally decline with the addition of subsequent waves.

The kill rate had stabilized by wave III as it changed little with the addition of data from subsequent waves (IV, V) despite the considerable increase in response rate. This result is inconsistent with the theoretical expectation that the statistic would continue to decrease with increasing response rate (Filion 1980). Soprovich (1989) found a kill rate of 0.207 for respondents (response rate of 58.9%) as compared to 0.134 for non-respondents for a much larger sample (n = 2551) of general moose hunters from the 1986 season. The stabilization of kill rate at a response rate of 62.6% for the pilot estimate is surprising given the substantial difference between the first 58.9% of the sample (respondents) and the estimate for the remaining portion (non-respondents) found for the 1986 general moose season. The results of the pilot study are also generally inconsistent with those of Barbowski (1972) for an increase in response rate from 62.6% to 86.0% for 5 districts (as estimated from figures in Barbowski 1972). Barbowski (1972) did, however, document the occurrence of a relatively stable success rate over a range of response (eg., an increase of approximately 20% in response rate) for several districts. Additionally, Barbowski (1972) documented an increase in success rate with the addition of a subsequent wave for 1 district. It is worthwhile to note that the sampling intensity was low (approximately 10-15% according to Gollat and Timmermann 1987), sample size was small (n = 518, number of responses = 396), and the relationship between success rate and kill rate volatile, which suggests that random error may have significantly influenced the results from this 1 district. It should also be noted that Barbowski (1972)

evaluated success rate (undefined) which, in Manitoba, is different from kill rate. This difference could be important because the proportion of licensees who hunt can be less for late respondents (Soprovich 1989 and this study for waves IV and V combined).

The pilot estimate did not decrease as anticipated, at response rates >62.6% and possible explanations for this result are:

(i) The non-response bias found in the 1986 study (Soprovich 1989) was mostly due to a lower kill rate for "hard-core" non-respondents, a possibility suggested by Filion (1980) for questionnaire surveys. It is possible that non-respondents (if non-deliverables are treated as non-respondents) had a very low kill rate. It should be noted, though, that even if all non-respondents in the pilot study had responded as unsuccessful, the kill rate at a response rate of 62.6% would still not be statistically different (if a two-tailed test were used, P = 0.08) from that of the remaining 32.4% of the sample (10.2%). The probability of a zero kill rate for "hard-core" non-respondents is low and, further to this, it appears that the success of non-deliverables, at least for game birds, can be intermediate between respondents and non-respondents or similar to respondents (Martinson and Whitesell 1964).

(ii) The small sample sizes for the pilot study may have prohibited the detection of relatively small differences between waves of response. The last 2 waves (IV and V) consisted of only 98 responses, the 95% confidence interval for kill rate was wide (0.088, 0.2384) for this group, and the statistic is prone to substantial influence by individual success (i.e., a successful hunter could increase kill rate by >1%). The lack of difference in kill rate between the first 3 waves and last 2 waves may result from simple random variation of a small sample drawn at a low sampling intensity, the cause suggested for Barbowski's (1972) results from 1 district.

(iii) Data on non-respondents were collected by personal interview for the 1986 study which may have introduced a different bias (i.e., different data collection techniques) into the results (Filion

1980). If licensees responded more accurately to personal interview than questionnaire, the difference obtained in the 1986 study could have been due to response bias and/or a combination of response bias and non-response bias (response bias has been documented in Manitoba with a previous questionnaire design). If response bias was all or partially responsible for the results from the study of the 1986 general moose season, true kill rate may have been overestimated by even more than 23.7% for both seasons and 43.0% for the late season.

(iv) The size of the non-response bias may not be independent of kill rate. If this is true, then perhaps the lower kill rate for 1987 (0.175 at a response rate of 51% versus 0.207 at a response rate of 58.9%, P = 0.028) had some influence on the ability to compare data from 1986 and 1987.

The results from this study indicate that increasing the response rate from 62.6% to 86.0% does not influence kill rate when these additional responses are obtained by questionnaire. Although there appears to be little or no gain in accuracy, increased response does result in a gain in precision of the estimate (i.e., narrower confidence intervals). If accuracy is paramount, more investigation is required to determine which, if any, of the above hypotheses are correct.

The difference between kill rate estimates from the standard and pilot methods was not large; however, the difference may have been greater if the pilot method had sampled the additional, late-returned stubs sampled by the standard method and if response rate had been closer to average for the standard method (it appears to have been relatively high; however, it also appears that this is an overestimate due to inaccurate records). The overestimate of kill rate in the pilot study at the mean response rate from 1981 to 1985 was less than the overestimate of 23.7% found at a similar response rate for the 1986 general moose season (Soprovich 1989), perhaps due in part to the 14% of the sample for which no response was obtained. The estimated harvest from the late season was greater by the standard method than the pilot method. This result is similar in direction but less in magnitude to that from the 1986 study where the standard method overestimated late season harvest by 43.0%.

CONCLUSION

The pilot study indicates that once a response rate of 62.6% has been achieved, further response by questionnaire results in little or no gain in accuracy. It should be noted that the data from the pilot study is potentially subject to substantial random variation due to the small sample size and low sampling intensity (8.3%). Important, small differences in kill rate might not have been detected as a result. The pilot study further indicates that obtaining a minimum response rate of 62.6% is desirable from the point of view of accuracy. Kill rate at this response rate is still an index and it is debatable how much more comparable the index is at a response rate of 62.6% as opposed to 46% (the average response rate to 1 mailing). Although the increase in comparability is unknown, a conservative approach is to ignore this question because the potential impact of non-response bias lessens as total response is approached.

Although the kill rate estimates obtained by the pilot method, particularly for the late season, are considered to be more accurate, the pilot method, as presently designed (8.3% sampling intensity, 86.0% obtainable response), does not appear to result in statistics which are considerably different from the standard method. The estimate of harvest by general moose hunters can be collected at lower expense and with greater accuracy by the pilot method; however, the standard method may be more desirable as an index to change (particularly if statistics are determined on the basis of a constant response rate) because of the significant sampling intensity (50%). Additionally, it is important to recognize that the usefulness of the G.H.A. estimates from the pilot program were seriously and adversely impacted by sample size. The importance of non-response bias will relate to the magnitude of annual variation in true kill rate. If the magnitude of annual variation is considerably greater than the error due to non-response bias, this error becomes relatively insignificant. To gain precise, accurate statistics, sampling of non-respondents (last 14% or more dependent upon survey design) is indicated, in combination with high sampling intensities.

RECOMMENDATION

1. Certified mail is much less expensive than registered mail and would allow the sender to determine if a questionnaire had been received by a licensee. Certified mail should be considered as an option in subsequent survey experiments.

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APPENDIX I. Questionnaire and accompanying information sent to each licensee in sample. Orange label attached to questionnaires sent by registered mail.

IMPORTANT: PLEASE ANSWER ALL POSSIBLE QUESTIONS AND RETURN, EVEN IF YOU DID NOT HUNT OR TAG AN ANIMAL!!

1. Did you hunt in the 1987 moose firearm season? YES ☐ NO ☐
2. Please estimate the number of days you hunted by game hunting area:

Game Hunting Area (see map)	Number of Days Hunted Sept./Oct./Nov.	Number of Days Hunted Dec.
G.H.A. ☐	☐	☐
G.H.A. ☐	☐	☐
G.H.A. ☐	☐	☐

3. Did you tag a moose? YES ☐ NO ☐
   (Party hunters: Do not mark "Yes" unless your game tag was used.)
4. If yes, please indicate the game hunting area, age and sex of the animal you tagged.

Sept./Oct./Nov.: G.H.A. ☐ Age: Adult ☐ Immature ☐* Sex: Male ☐ Female ☐
Dec.: G.H.A. ☐ Age: Adult ☐ Immature ☐* Sex: Male ☐ Female ☐
* BORN IN 1987

MG-118.34M

Manitoba Hunter:

Each year we select a sample of moose hunters and request their help by completing a questionnaire. Please return the completed postcard as soon as possible; even if you did not hunt or kill a moose

Your reply will assist us in our management efforts to provide a sound population base for future years. From our 1986 survey we estimated that 5,000 hunters harvested 1,180 moose.

NO POSTAGE OR ENVELOPE IS REQUIRED. YOUR SIGNATURE IS NOT NECESSARY.

1987

SEPTEMBER

s	m	t	w	t	f	s
		1	2	3	4	

OCTOBER

s	m	t	w	t	f	s
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

THANK YOU

1987

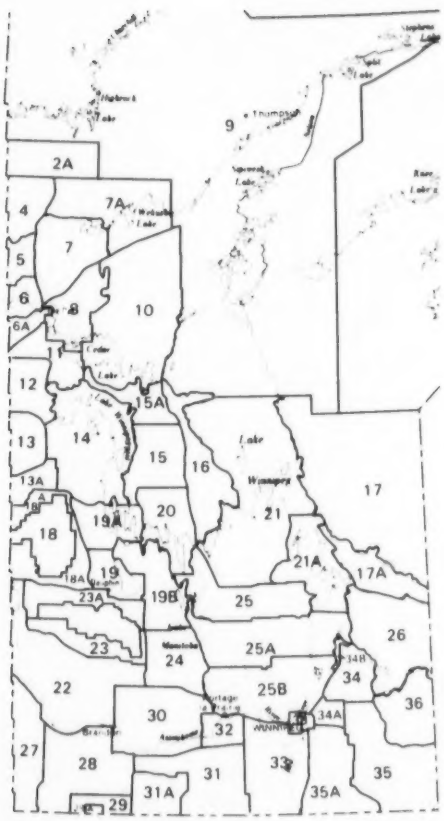
NOVEMBER

s	m	t	w	t	f	s
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

DECEMBER

s	m	t	w	t	f	s
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

MG-11834M



MAN 267

IMPORTANT: Please answer and return even if you did not hunt or tag a moose.

APPENDIX II. Detailed results for successive waves of response for the early, late, and both seasons combined.

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

Wave 1

SPECIES : M
SEASONS : F
DATE CHOICES : G

NUMBER OF LICENCES SOLD : 5400
NUMBER OF RESPONSES : 168
NUMBER OF RESPONSES HUNTED - OVERALL : 163
EARLY : 135
LATE : 66

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	6.39	4.32	7.04
Kills / Hunter	0.21	0.06	0.20
Days / Kill	29.72	71.25	34.76
HUNTER ESTIMATES >			
Number of Hunters	4339 +- 336	2121 +- 410	5239 +- 153
HARVEST ESTIMATES >			
Adult Male	932 +- 321	64 +- 104	996 +- 329
Adult Female		32 +- 78	32 +- 78
Immature Male			
Immature Female			
Unknown		32 +- 78	32 +- 78
Total	932 +- 321	129 +- 139	1061 +- 336

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2A	1	9	0	0	0	0	0	0	9.00	0.00	*****
3	1	12	1	0	1	0	0	0	12.00	1.00	12.00
4	3	10	1	0	1	0	0	0	3.33	0.33	10.00
5	2	5	1	0	1	0	0	0	2.50	0.50	5.00
7	8	33	2	0	2	0	0	0	4.12	0.25	16.50
7A	7	73	0	0	0	0	0	0	10.43	0.00	*****
8	1	2	0	0	0	0	0	0	2.00	0.00	*****
9	32	257	9	0	9	0	0	0	8.03	0.28	28.56
10	10	46	1	0	1	0	0	0	4.60	0.10	46.00
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	7	24	2	0	2	0	0	0	3.43	0.29	12.00
14	10	68	1	0	1	0	0	0	6.80	0.10	68.00
15	11	68	4	0	4	0	0	0	6.18	0.36	17.00
15A	4	18	0	0	0	0	0	0	4.50	0.00	*****
17	9	44	3	0	3	0	0	0	4.89	0.33	14.67
17A	10	59	3	0	3	0	0	0	5.90	0.30	19.67
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	5	20	0	0	0	0	0	0	4.00	0.00	*****
21	5	20	0	0	0	0	0	0	4.00	0.00	*****
21A	8	28	1	0	1	0	0	0	3.50	0.12	28.00
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	1	6	0	0	0	0	0	0	6.00	0.00	*****
26	3	11	0	0	0	0	0	0	3.67	0.00	*****
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	2	9	0	0	0	0	0	0	4.50	0.00	*****
*** Total	***										
	146	862	29	0	29	0	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - LATE SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
5	1	3	0	0	0	0	0	0	3.00	0.00	*****
7	4	16	0	0	0	0	0	0	4.00	0.00	*****
7A	1	3	0	0	0	0	0	0	3.00	0.00	*****
9	8	39	0	0	0	0	0	0	4.88	0.00	*****
10	1	4	0	0	0	0	0	0	4.00	0.00	*****
12	4	8	1	1	0	0	0	0	2.00	0.25	8.00
13	1	6	0	0	0	0	0	0	6.00	0.00	*****
14	11	38	1	0	1	0	0	0	3.45	0.09	38.00
15	2	3	0	0	0	0	0	0	1.50	0.00	*****
15A	2	4	0	0	0	0	0	0	2.00	0.00	*****
17A	4	18	0	0	0	0	0	0	4.50	0.00	*****
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	1	3	0	0	0	0	0	0	3.00	0.00	*****
21	1	1	0	0	0	0	0	0	1.00	0.00	*****
21A	5	9	0	0	0	0	0	0	1.80	0.00	*****
26	19	108	1	0	1	0	0	0	5.68	0.05	108.0
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
*** Total ***	68	285	4	1	2	1	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - SEASONS TOTAL

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
2A	1	9	0	0	0	0	0	0	9.00	0.00	*****
3	1	12	1	0	1	0	0	0	12.00	1.00	12.00
4	3	10	1	0	1	0	0	0	3.33	0.33	10.00
5	2	8	1	0	1	0	0	0	4.00	0.50	8.00
7	8	49	2	0	2	0	0	0	6.12	0.25	24.50
7A	7	76	0	0	0	0	0	0	10.86	0.00	*****
8	1	2	0	0	0	0	0	0	2.00	0.00	*****
9	33	296	9	0	9	0	0	0	8.97	0.27	32.89
10	10	50	1	0	1	0	0	0	5.00	0.10	50.00
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	9	32	3	1	2	0	0	0	3.56	0.33	10.67
13	1	6	0	0	0	0	0	0	6.00	0.00	*****
14	18	106	2	0	2	0	0	0	5.89	0.11	53.00
15	11	71	4	0	4	0	0	0	6.45	0.36	17.75
15A	5	22	0	0	0	0	0	0	4.40	0.00	*****
17	9	44	3	0	3	0	0	0	4.89	0.33	14.67
17A	12	77	3	0	3	0	0	0	6.42	0.25	25.67
19	1	10	0	0	0	0	0	0	10.00	0.00	*****
19A	5	23	0	0	0	0	0	0	4.60	0.00	*****
21	6	21	0	0	0	0	0	0	3.50	0.00	*****
21A	9	37	1	0	1	0	0	0	4.11	0.11	37.00
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	1	6	0	0	0	0	0	0	6.00	0.00	*****
26	21	119	1	0	1	0	0	0	5.67	0.05	119.0
34	1	30	0	0	0	0	0	0	30.00	0.00	*****
UNK	2	9	0	0	0	0	0	0	4.50	0.00	*****
*** Total ***	182	1147	33	1	31	1	0	0			

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

SPECIES : M
SEASONS : F
DATE CHOICES : G

Waves I-II

NUMBER OF LICENCES SOLD : 5400
NUMBER OF RESPONSES : 223
NUMBER OF RESPONSES HUNTED - OVERALL : 211
EARLY : 176
LATE : 82

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	6.59	4.41	7.21
Kills / Hunter	0.19	0.06	0.18
Days / Kill	34.12	72.40	39.03
HUNTER ESTIMATES >			
Number of Hunters	4262 +- 296	1986 +- 347	5109 +- 169
HARVEST ESTIMATES >			
Adult Male	823 +- 262	73 +- 92	896 +- 271
Adult Female		24 +- 59	24 +- 59
Immature Male			
Immature Female			
Unknown		24 +- 59	24 +- 59
Total	823 +- 262	121 +- 115	944 +- 276

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	1	6	1	0	1	0	0	0	6.00	1.00	6.00
2A	2	17	0	0	0	0	0	0	8.50	0.00	*****
3	3	19	1	0	1	0	0	0	6.33	0.33	19.00
4	5	18	1	0	1	0	0	0	3.60	0.20	18.00
5	2	5	1	0	1	0	0	0	2.50	0.50	5.00
7	11	41	2	0	2	0	0	0	3.73	0.18	20.50
7A	9	78	0	0	0	0	0	0	8.67	0.00	*****
8	2	3	0	0	0	0	0	0	1.50	0.00	*****
9	41	300	10	0	10	0	0	0	7.32	0.24	30.00
10	13	85	3	0	3	0	0	0	6.54	0.23	28.33
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	7	24	2	0	2	0	0	0	3.43	0.29	12.00
14	12	81	1	0	1	0	0	0	6.75	0.08	81.00
15	12	75	4	0	4	0	0	0	6.25	0.33	18.75
15A	5	23	0	0	0	0	0	0	4.60	0.00	*****
17	12	53	3	0	3	0	0	0	4.42	0.25	17.67
17A	15	108	3	0	3	0	0	0	7.20	0.20	36.00
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	6	36	0	0	0	0	0	0	6.00	0.00	*****
21	8	33	1	0	1	0	0	0	4.12	0.12	33.00
21A	10	79	1	0	1	0	0	0	7.90	0.10	79.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	4	14	0	0	0	0	0	0	3.50	0.00	*****
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	2	9	0	0	0	0	0	0	4.50	0.00	*****
*** Total	*** 191	1160	34	0	34	0	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - LATE SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
3	1	4	0	0	0	0	0	0	4.00	0.00	*****
5	2	7	0	0	0	0	0	0	3.50	0.00	*****
7	5	22	0	0	0	0	0	0	4.40	0.00	*****
7A	1	3	0	0	0	0	0	0	3.00	0.00	*****
9	8	39	0	0	0	0	0	0	4.88	0.00	*****
10	1	4	0	0	0	0	0	0	4.00	0.00	*****
12	4	8	1	1	0	0	0	0	2.00	0.25	8.00
13	2	11	0	0	0	0	0	0	5.50	0.00	*****
14	12	41	1	0	1	0	0	0	3.42	0.08	41.00
15	3	7	0	0	0	0	0	0	2.33	0.00	*****
15A	2	4	0	0	0	0	0	0	2.00	0.00	*****
17A	7	34	0	0	0	0	0	0	4.86	0.00	*****
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	1	3	0	0	0	0	0	0	3.00	0.00	*****
21	1	1	0	0	0	0	0	0	1.00	0.00	*****
21A	5	9	0	0	0	0	0	0	1.80	0.00	*****
26	27	143	2	0	2	0	0	0	5.30	0.07	71.50
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
*** Total ***	85	362	5	1	3	1	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - SEASONS TOTAL

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	2	8	2	0	1	1	0	0	4.00	1.00	4.00
2A	2	17	0	0	0	0	0	0	8.50	0.00	*****
3	4	23	1	0	1	0	0	0	5.75	0.25	23.00
4	5	18	1	0	1	0	0	0	3.60	0.20	18.00
5	3	12	1	0	1	0	0	0	4.00	0.33	12.00
7	11	63	2	0	2	0	0	0	5.73	0.18	31.50
7A	9	81	0	0	0	0	0	0	9.00	0.00	*****
8	2	3	0	0	0	0	0	0	1.50	0.00	*****
9	42	339	10	0	10	0	0	0	8.07	0.24	33.90
10	13	89	3	0	3	0	0	0	6.85	0.23	29.67
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	9	32	3	1	2	0	0	0	3.56	0.33	10.67
13	2	11	0	0	0	0	0	0	5.50	0.00	*****
14	21	122	2	0	2	0	0	0	5.81	0.10	61.00
15	12	82	4	0	4	0	0	0	6.83	0.33	20.50
15A	6	27	0	0	0	0	0	0	4.50	0.00	*****
17	12	53	3	0	3	0	0	0	4.42	0.25	17.67
17A	18	142	3	0	3	0	0	0	7.89	0.17	47.33
19	1	10	0	0	0	0	0	0	10.00	0.00	*****
19A	6	39	0	0	0	0	0	0	6.50	0.00	*****
21	9	34	1	0	1	0	0	0	3.78	0.11	34.00
21A	11	88	1	0	1	0	0	0	8.00	0.09	88.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	30	157	2	0	2	0	0	0	5.23	0.07	78.50
34	1	30	0	0	0	0	0	0	30.00	0.00	*****
UNK	2	9	0	0	0	0	0	0	4.50	0.00	*****
*** Total ***	240	1522	39	1	37	1	0	0			

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

SPECIES : M
SEASONS : F
DATE CHOICES : G

Waves I-III

NUMBER OF LICENCES SOLD : 5400
NUMBER OF RESPONSES : 263
NUMBER OF RESPONSES HUNTED - OVERALL : 246
EARLY : 206
LATE : 94

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	6.56	4.55	7.24
Kills / Hunter	0.18	0.05	0.17
Days / Kill	35.58	85.60	41.40
HUNTER ESTIMATES >			
Number of Hunters	4230 +- 273	1930 +- 316	5051 +- 167
HARVEST ESTIMATES >			
Adult Male	780 +- 234	62 +- 78	842 +- 242
Adult Female		21 +- 50	21 +- 50
Immature Male			
Immature Female			
Unknown		21 +- 50	21 +- 50
Total	780 +- 234	103 +- 97	883 +- 246

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	1	6	1	0	1	0	0	0	6.00	1.00	6.00
2A	4	27	0	0	0	0	0	0	6.75	0.00	*****
3	3	19	1	0	1	0	0	0	6.33	0.33	19.00
4	6	30	1	0	1	0	0	0	5.00	0.17	30.00
5	4	8	1	0	1	0	0	0	2.00	0.25	8.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	13	52	2	0	2	0	0	0	4.00	0.15	26.00
7A	10	83	0	0	0	0	0	0	8.30	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	47	339	12	0	12	0	0	0	7.21	0.26	28.25
10	15	91	4	0	4	0	0	0	6.07	0.27	22.75
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	10	44	2	0	2	0	0	0	4.40	0.20	22.00
13	1	8	0	0	0	0	0	0	8.00	0.00	*****
14	14	84	1	0	1	0	0	0	6.00	0.07	84.00
15	12	75	4	0	4	0	0	0	6.25	0.33	18.75
15A	5	23	0	0	0	0	0	0	4.60	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	13	55	4	0	4	0	0	0	4.23	0.31	13.75
17A	17	115	3	0	3	0	0	0	6.76	0.18	38.33
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	9	57	0	0	0	0	0	0	6.33	0.00	*****
21	10	45	1	0	1	0	0	0	4.50	0.10	45.00
21A	11	89	1	0	1	0	0	0	8.09	0.09	89.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	5	19	0	0	0	0	0	0	3.80	0.00	*****
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	3	14	0	0	0	0	0	0	4.67	0.00	*****
*** Total	***										
	227	1352	38	0	38	0	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - LATE SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
3	1	4	0	0	0	0	0	0	4.00	0.00	*****
5	2	7	0	0	0	0	0	0	3.50	0.00	*****
7	6	23	0	0	0	0	0	0	3.83	0.00	*****
7A	1	3	0	0	0	0	0	0	3.00	0.00	*****
9	8	39	0	0	0	0	0	0	4.88	0.00	*****
10	1	4	0	0	0	0	0	0	4.00	0.00	*****
12	7	24	1	1	0	0	0	0	3.43	0.14	24.00
13	3	13	0	0	0	0	0	0	4.33	0.00	*****
14	15	56	1	0	1	0	0	0	3.73	0.07	56.00
15	3	7	0	0	0	0	0	0	2.33	0.00	*****
15A	2	4	0	0	0	0	0	0	2.00	0.00	*****
17	1	4	0	0	0	0	0	0	4.00	0.00	*****
17A	7	34	0	0	0	0	0	0	4.86	0.00	*****
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	1	3	0	0	0	0	0	0	3.00	0.00	*****
21	2	3	0	0	0	0	0	0	1.50	0.00	*****
21A	6	12	0	0	0	0	0	0	2.00	0.00	*****
26	30	166	2	0	2	0	0	0	5.53	0.07	83.00
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
*** Total ***	99	428	5	1	3	1	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - SEASONS TOTAL

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	2	8	2	0	1	1	0	0	4.00	1.00	4.00
2A	4	27	0	0	0	0	0	0	6.75	0.00	*****
3	4	23	1	0	1	0	0	0	5.75	0.25	23.00
4	6	30	1	0	1	0	0	0	5.00	0.17	30.00
5	5	15	1	0	1	0	0	0	3.00	0.20	15.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	14	75	2	0	2	0	0	0	5.36	0.14	37.50
7A	10	86	0	0	0	0	0	0	8.60	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	48	378	12	0	12	0	0	0	7.88	0.25	31.50
10	15	95	4	0	4	0	0	0	6.33	0.27	23.75
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	13	68	3	1	2	0	0	0	5.23	0.23	22.67
13	3	21	0	0	0	0	0	0	7.00	0.00	*****
14	25	140	2	0	2	0	0	0	5.60	0.08	70.00
15	12	82	4	0	4	0	0	0	6.83	0.33	20.50
15A	6	27	0	0	0	0	0	0	4.50	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	14	59	4	0	4	0	0	0	4.21	0.29	14.75
17A	20	149	3	0	3	0	0	0	7.45	0.15	49.67
19	1	10	0	0	0	0	0	0	10.00	0.00	*****
19A	9	60	0	0	0	0	0	0	6.67	0.00	*****
21	11	48	1	0	1	0	0	0	4.36	0.09	48.00
21A	12	101	1	0	1	0	0	0	8.42	0.08	101.0
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	33	185	2	0	2	0	0	0	5.61	0.06	92.50
34	1	30	0	0	0	0	0	0	30.00	0.00	*****
UNK	3	14	0	0	0	0	0	0	4.67	0.00	*****
*** Total	***										
	283	1780	43	1	41	1	0	0			

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

Waves I-IV

SPECIES : M
SEASONS : F
DATE CHOICES : G

NUMBER OF LICENCES SOLD : 5400
NUMBER OF RESPONSES : 282
NUMBER OF RESPONSES HUNTED - OVERALL : 260
EARLY : 217
LATE : 99

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	6.51	4.68	7.21
Kills / Hunter	0.19	0.05	0.18
Days / Kill	33.62	92.60	39.89
HUNTER ESTIMATES >			
Number of Hunters	4155 +- 268	1896 +- 303	4979 +- 174
HARVEST ESTIMATES >			
Adult Male	804 +- 228	57 +- 73	862 +- 235
Adult Female		19 +- 46	19 +- 46
Immature Male			
Immature Female			
Unknown		19 +- 46	19 +- 46
Total	804 +- 228	96 +- 91	900 +- 239

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	1	6	1	0	1	0	0	0	6.00	1.00	6.00
2A	4	27	0	0	0	0	0	0	6.75	0.00	*****
3	3	19	1	0	1	0	0	0	6.33	0.33	19.00
4	7	35	2	0	2	0	0	0	5.00	0.29	17.50
5	4	8	1	0	1	0	0	0	2.00	0.25	8.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	14	57	3	0	3	0	0	0	4.07	0.21	19.00
7A	10	83	0	0	0	0	0	0	8.30	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	51	365	13	0	13	0	0	0	7.16	0.25	28.08
10	16	96	4	0	4	0	0	0	6.00	0.25	24.00
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	11	49	2	0	2	0	0	0	4.45	0.18	24.50
13	1	8	0	0	0	0	0	0	8.00	0.00	*****
14	14	84	1	0	1	0	0	0	6.00	0.07	84.00
15	12	75	4	0	4	0	0	0	6.25	0.33	18.75
15A	5	23	0	0	0	0	0	0	4.60	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	13	55	4	0	4	0	0	0	4.23	0.31	13.75
17A	17	115	3	0	3	0	0	0	6.76	0.18	38.33
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	10	65	0	0	0	0	0	0	6.50	0.00	*****
21	12	51	2	0	2	0	0	0	4.25	0.17	25.50
21A	11	89	1	0	1	0	0	0	8.09	0.09	89.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	5	19	0	0	0	0	0	0	3.80	0.00	*****
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	3	14	0	0	0	0	0	0	4.67	0.00	*****
*** Total	***										
	238	1412	42	0	42	0	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - LATE SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
3	1	4	0	0	0	0	0	0	4.00	0.00	*****
5	2	7	0	0	0	0	0	0	3.50	0.00	*****
7	6	23	0	0	0	0	0	0	3.83	0.00	*****
7A	1	3	0	0	0	0	0	0	3.00	0.00	*****
9	9	49	0	0	0	0	0	0	5.44	0.00	*****
10	1	4	0	0	0	0	0	0	4.00	0.00	*****
12	7	24	1	1	0	0	0	0	3.43	0.14	24.00
13	3	13	0	0	0	0	0	0	4.33	0.00	*****
14	16	66	1	0	1	0	0	0	4.12	0.06	66.00
15	4	10	0	0	0	0	0	0	2.50	0.00	*****
15A	2	4	0	0	0	0	0	0	2.00	0.00	*****
17	1	4	0	0	0	0	0	0	4.00	0.00	*****
17A	8	38	0	0	0	0	0	0	4.75	0.00	*****
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	1	3	0	0	0	0	0	0	3.00	0.00	*****
21	3	7	0	0	0	0	0	0	2.33	0.00	*****
21A	6	12	0	0	0	0	0	0	2.00	0.00	*****
26	31	170	2	0	2	0	0	0	5.48	0.06	85.00
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
*** Total	*** 105	463	5	1	3	1	0	0			

Page No. 1 Species=M, Season=F, Date Choices=G
07/20/88

GHA BREAKDOWN - SEASONS TOTAL

GHA	# of Hunters	# of Days	# of Kills	<-- AGE UNK	AM	AF	SEX IM	--> IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	2	8	2	0	1	1	0	0	4.00	1.00	4.00
2A	4	27	0	0	0	0	0	0	6.75	0.00	*****
3	4	23	1	0	1	0	0	0	5.75	0.25	23.00
4	7	35	2	0	2	0	0	0	5.00	0.29	17.50
5	5	15	1	0	1	0	0	0	3.00	0.20	15.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	15	80	3	0	3	0	0	0	5.33	0.20	26.67
7A	10	86	0	0	0	0	0	0	8.60	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	52	414	13	0	13	0	0	0	7.96	0.25	31.85
10	16	100	4	0	4	0	0	0	6.25	0.25	25.00
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	14	73	3	1	2	0	0	0	5.21	0.21	24.33
13	3	21	0	0	0	0	0	0	7.00	0.00	*****
14	26	150	2	0	2	0	0	0	5.77	0.08	75.00
15	13	85	4	0	4	0	0	0	6.54	0.31	21.25
15A	6	27	0	0	0	0	0	0	4.50	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	14	59	4	0	4	0	0	0	4.21	0.29	14.75
17A	21	153	3	0	3	0	0	0	7.29	0.14	51.00
19	1	10	0	0	0	0	0	0	10.00	0.00	*****
19A	10	68	0	0	0	0	0	0	6.80	0.00	*****
21	13	58	2	0	2	0	0	0	4.46	0.15	29.00
21A	12	101	1	0	1	0	0	0	8.42	0.08	101.0
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	34	189	2	0	2	0	0	0	5.56	0.06	94.50
34	1	30	0	0	0	0	0	0	30.00	0.00	*****
UNK	3	14	0	0	0	0	0	0	4.67	0.00	*****
*** Total	***										
	298	1875	47	1	45	1	0	0			

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

SPECIES : M
SEASONS : F
Waves I-V DATE CHOICES : A,B,G

NUMBER OF LICENCES SOLD : 5400
NUMBER OF RESPONSES : 361
NUMBER OF RESPONSES HUNTED - OVERALL : 326
EARLY : 271
LATE : 126

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	6.68	4.80	7.40
Kills / Hunter	0.18	0.07	0.18
Days / Kill	36.18	67.22	40.92
HUNTER ESTIMATES >			
Number of Hunters	4054 +- 241	1885 +- 264	4876 +- 167
HARVEST ESTIMATES >			
Adult Male	748 +- 194	105 +- 82	853 +- 204
Adult Female		15 +- 36	15 +- 36
Immature Male			
Immature Female			
Unknown		15 +- 36	15 +- 36
Total	748 +- 194	135 +- 91	883 +- 207

Page No. 1 Species=M, Season=F, Date Choices=A,B,G
07/20/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	1	6	1	0	1	0	0	0	6.00	1.00	6.00
2A	6	42	0	0	0	0	0	0	7.00	0.00	*****
3	3	19	1	0	1	0	0	0	6.33	0.33	19.00
4	9	58	2	0	2	0	0	0	6.44	0.22	29.00
5	4	8	1	0	1	0	0	0	2.00	0.25	8.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	17	91	3	0	3	0	0	0	5.35	0.18	30.33
7A	11	91	0	0	0	0	0	0	8.27	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	66	468	16	0	16	0	0	0	7.09	0.24	29.25
10	18	109	5	0	5	0	0	0	6.06	0.28	21.80
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	13	57	2	0	2	0	0	0	4.38	0.15	28.50
13	1	8	0	0	0	0	0	0	8.00	0.00	*****
14	19	109	2	0	2	0	0	0	5.74	0.11	54.50
15	13	80	4	0	4	0	0	0	6.15	0.31	20.00
15A	7	30	0	0	0	0	0	0	4.29	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	16	78	4	0	4	0	0	0	4.88	0.25	19.50
17A	22	133	3	0	3	0	0	0	6.05	0.14	44.33
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	12	88	1	0	1	0	0	0	7.33	0.08	88.00
21	17	67	3	0	3	0	0	0	3.94	0.18	22.33
21A	14	126	2	0	2	0	0	0	9.00	0.14	63.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	7	26	0	0	0	0	0	0	3.71	0.00	*****
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	7	46	0	0	0	0	0	0	6.57	0.00	*****
*** Total ***	297	1809	50	0	50	0	0	0			

Page No. 1 Species=M, Season=F, Date Choices=A,B,G
07/20/88

GHA BREAKDOWN - LATE SEASON

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- SEX --> UNK	AM	AF	IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
2	1	2	1	0	0	1	0	0	2.00	1.00	2.00
2A	1	4	0	0	0	0	0	0	4.00	0.00	*****
3	1	4	0	0	0	0	0	0	4.00	0.00	*****
5	3	14	0	0	0	0	0	0	4.67	0.00	*****
7	7	25	1	0	1	0	0	0	3.57	0.14	25.00
7A	1	3	0	0	0	0	0	0	3.00	0.00	*****
9	12	63	0	0	0	0	0	0	5.25	0.00	*****
10	2	8	0	0	0	0	0	0	4.00	0.00	*****
12	8	27	1	1	0	0	0	0	3.38	0.12	27.00
13	3	13	0	0	0	0	0	0	4.33	0.00	*****
14	19	83	2	0	2	0	0	0	4.37	0.11	41.50
15	4	10	0	0	0	0	0	0	2.50	0.00	*****
15A	3	9	0	0	0	0	0	0	3.00	0.00	*****
17	2	8	0	0	0	0	0	0	4.00	0.00	*****
17A	12	53	1	0	1	0	0	0	4.42	0.08	53.00
19	1	5	0	0	0	0	0	0	5.00	0.00	*****
19A	1	3	0	0	0	0	0	0	3.00	0.00	*****
21	4	10	0	0	0	0	0	0	2.50	0.00	*****
21A	7	22	0	0	0	0	0	0	3.14	0.00	*****
26	39	207	3	0	3	0	0	0	5.31	0.08	69.00
34	1	15	0	0	0	0	0	0	15.00	0.00	*****
UNK	2	17	0	0	0	0	0	0	8.50	0.00	*****
*** Total	***										
	134	605	9	1	7	1	0	0			

Page No. 1 Species=M, Season=F, Date Choices=A,B,G
07/20/88

GHA BREAKDOWN - SEASONS TOTAL

GHA	# of Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Hunter	Kills Per Hunter	Days Per Kill
1	1	4	0	0	0	0	0	0	4.00	0.00	*****
2	2	8	2	0	1	1	0	0	4.00	1.00	4.00
2A	6	46	0	0	0	0	0	0	7.67	0.00	*****
3	4	23	1	0	1	0	0	0	5.75	0.25	23.00
4	10	58	2	0	2	0	0	0	5.80	0.20	29.00
5	6	22	1	0	1	0	0	0	3.67	0.17	22.00
6A	1	7	0	0	0	0	0	0	7.00	0.00	*****
7	18	116	4	0	4	0	0	0	6.44	0.22	29.00
7A	11	94	0	0	0	0	0	0	8.55	0.00	*****
8	3	7	0	0	0	0	0	0	2.33	0.00	*****
9	67	531	16	0	16	0	0	0	7.93	0.24	33.19
10	18	117	5	0	5	0	0	0	6.50	0.28	23.40
11	1	6	0	0	0	0	0	0	6.00	0.00	*****
12	17	84	3	1	2	0	0	0	4.94	0.18	28.00
13	3	21	0	0	0	0	0	0	7.00	0.00	*****
14	34	192	4	0	4	0	0	0	5.65	0.12	48.00
15	14	90	4	0	4	0	0	0	6.43	0.29	22.50
15A	8	39	0	0	0	0	0	0	4.88	0.00	*****
16	1	2	0	0	0	0	0	0	2.00	0.00	*****
17	17	86	4	0	4	0	0	0	5.06	0.24	21.50
17A	29	186	4	0	4	0	0	0	6.41	0.14	46.50
19	1	10	0	0	0	0	0	0	10.00	0.00	*****
19A	12	91	1	0	1	0	0	0	7.58	0.08	91.00
21	19	77	3	0	3	0	0	0	4.05	0.16	25.67
21A	15	148	2	0	2	0	0	0	9.87	0.13	74.00
24	1	5	0	0	0	0	0	0	5.00	0.00	*****
25	2	10	0	0	0	0	0	0	5.00	0.00	*****
25A	2	8	0	0	0	0	0	0	4.00	0.00	*****
26	43	233	3	0	3	0	0	0	5.42	0.07	77.67
34	1	30	0	0	0	0	0	0	30.00	0.00	*****
UNK	7	63	0	0	0	0	0	0	9.00	0.00	*****
*** Total	*** 374	2414	59	1	57	1	0	0			

APPENDIX III. Detailed results from the standard method for the early, late, and both seasons combined.

SUMMARY QUESTIONNAIRE ANALYSIS REPORT 1987

GENERAL MOOSE FIREARM

NUMBER OF LICENCES/TAGS SOLD : 5882 / 5882

NUMBER OF QUESTIONNAIRES MAILED : 2696
NUMBER OF RESPONSES : 1375

RESPONSE RATE : 51%

NUMBER OF RESPONSES HUNTED - OVERALL : 1285
EARLY : 1038
LATE : 521

BREAKDOWN OF SEASONAL ESTIMATES(+- 95 % Confidence Intervals)

	EARLY SEASON	LATE SEASON	OVERALL
INDICES >			
Days / Hunter	5.74	4.47	6.45
Kills / Tag	0.19	0.08	0.19
Days / Kill	29.93	56.78	34.52
HUNTER ESTIMATES >			
Number of Hunters	4440 +- 119	2229 +- 134	5497 +- 69
HARVEST ESTIMATES >			
Adult Male	809 +- 96	150 +- 45	958 +- 103
Adult Female	13 +- 15		13 +- 15
Immature Male	13 +- 15	13 +- 15	26 +- 20
Immature Female			
Unknown	17 +- 17	13 +- 15	30 +- 22
Total	851 +- 98	175 +- 48	1027 +- 105

Page No. 1 GENERAL MOOSE FIREARM
05/12/88

GHA BREAKDOWN - EARLY SEASON

GHA	# of Tags/ Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Tag/ Hunter	Kills Per Tags/ Hunter	Days Per Kill
1	16	103	7	0	4	2	1	0	6.44	0.44	14.71
2	10	50	2	1	1	0	0	0	5.00	0.20	25.00
2A	14	51	3	0	3	0	0	0	3.64	0.21	17.00
3	16	102	4	1	3	0	0	0	6.38	0.25	25.50
4	29	120	7	0	7	0	0	0	4.14	0.24	17.14
5	41	238	4	0	4	0	0	0	5.80	0.10	59.50
6	5	17	2	0	2	0	0	0	3.40	0.40	8.50
6A	10	77	1	0	1	0	0	0	7.70	0.10	77.00
7	69	351	11	0	11	0	0	0	5.09	0.16	31.91
7A	42	267	9	0	9	0	0	0	6.36	0.21	29.67
8	9	42	0	0	0	0	0	0	4.67	0.00	*****
9	200	1315	39	0	39	0	0	0	6.58	0.20	33.72
10	56	259	10	0	9	0	1	0	4.62	0.18	25.90
11	13	53	2	0	2	0	0	0	4.08	0.15	26.50
12	74	388	16	1	15	0	0	0	5.24	0.22	24.25
13	6	24	3	0	2	1	0	0	4.00	0.50	8.00
14	90	418	17	1	16	0	0	0	4.64	0.19	24.59
15	48	209	11	0	11	0	0	0	4.35	0.23	19.00
15A	20	70	5	0	5	0	0	0	3.50	0.25	14.00
17	53	247	10	0	9	0	1	0	4.66	0.19	24.70
17A	88	411	9	0	9	0	0	0	4.67	0.10	45.67
19	3	7	0	0	0	0	0	0	2.33	0.00	*****
19A	29	173	4	0	4	0	0	0	5.97	0.14	43.25
20	2	7	0	0	0	0	0	0	3.50	0.00	*****
21	88	457	7	0	7	0	0	0	5.19	0.08	65.29
21A	48	217	12	0	12	0	0	0	4.52	0.25	18.08
23	1	6	0	0	0	0	0	0	6.00	0.00	*****
25	2	12	0	0	0	0	0	0	6.00	0.00	*****
25A	2	5	0	0	0	0	0	0	2.50	0.00	*****
25B	1	1	0	0	0	0	0	0	1.00	0.00	*****
26	38	124	2	0	2	0	0	0	3.26	0.05	62.00
30	1	6	0	0	0	0	0	0	6.00	0.00	*****
35	1	1	0	0	0	0	0	0	1.00	0.00	*****
35A	1	5	1	0	1	0	0	0	5.00	1.00	5.00
UNK	25	123	1	0	1	0	0	0	4.92	0.04	123.0
*** Total ***	1151	5956	199	4	189	3	3	0			

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GHA BREAKDOWN - LATE SEASON

GHA	# of Tags/ Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Tag/ Hunter	Kills Per Tags/ Hunter	Days Per Kill
1	1	2	0	0	0	0	0	0	2.00	0	2
2	3	8	0	0	0	0	0	0	2.67	0	8
2A	2	5	0	0	0	0	0	0	2.50	0	5
3	4	12	0	0	0	0	0	0	3.00	0	12
4	6	21	1	0	1	0	0	0	3.50	1	21
5	15	40	1	0	1	0	0	0	2.67	1	40
6	2	7	0	0	0	0	0	0	3.50	0	7
6A	1	4	0	0	0	0	0	0	4.00	0	4
7	31	104	3	0	3	0	0	0	3.35	3	104
7A	8	26	0	0	0	0	0	0	3.25	0	26
8	1	3	0	0	0	0	0	0	3.00	0	3
9	45	145	0	0	0	0	0	0	3.22	0	145
10	19	88	0	0	0	0	0	0	4.63	0	88
11	4	18	0	0	0	0	0	0	4.50	0	18
12	53	238	4	0	4	0	0	0	4.49	4	238
13	5	18	0	0	0	0	0	0	3.60	0	18
13A	1	2	0	0	0	0	0	0	2.00	0	2
14	65	312	8	2	6	0	0	0	4.80	8	312
15	9	17	1	0	1	0	0	0	1.89	1	17
15A	1	1	0	0	0	0	0	0	1.00	0	1
17	16	65	2	0	1	0	1	0	4.06	2	65
17A	38	168	4	0	4	0	0	0	4.42	4	168
18	1	3	0	0	0	0	0	0	3.00	0	3
19	1	6	0	0	0	0	0	0	6.00	0	6
19A	3	15	0	0	0	0	0	0	5.00	0	15
21	44	139	5	0	5	0	0	0	3.16	5	139
21A	26	101	2	0	2	0	0	0	3.88	2	101
22	1	5	0	0	0	0	0	0	5.00	0	5
23A	1	3	0	0	0	0	0	0	3.00	0	3
25	1	5	0	0	0	0	0	0	5.00	0	5
25A	1	1	0	0	0	0	0	0	1.00	0	1
25B	1	1	0	0	0	0	0	0	1.00	0	1
26	148	673	8	0	6	0	2	0	4.55	8	673
32	1	4	0	0	0	0	0	0	4.00	0	4
34	1	5	0	0	0	0	0	0	5.00	0	5
35	1	1	0	0	0	0	0	0	1.00	0	1
35A	2	7	0	0	0	0	0	0	3.50	0	7
36	1	12	0	0	0	0	0	0	12.00	0	12
UNK	8	43	2	1	1	0	0	0	5.38	2	43
*** Total ***	572	2328	41	3	35	0	3	0			

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GENERAL MOOSE FIREARM

GHA BREAKDOWN - SEASON TOTAL

GHA	# of Tags/ Hunters	# of Days	# of Kills	<-- AGE ---- UNK	AM	AF	SEX --> IM	IF	Days Per Tag/ Hunter	Kills Per Tags/ Hunter	Days Per Kill
1	17	105	7	0	4	2	1	0	6.18	0.41	15.00
2	10	58	2	1	1	0	0	0	5.80	0.20	29.00
2A	15	56	3	0	3	0	0	0	3.73	0.20	18.67
3	19	114	4	1	3	0	0	0	6.00	0.21	28.50
4	33	141	8	0	8	0	0	0	4.27	0.24	17.62
5	45	278	5	0	5	0	0	0	6.18	0.11	55.60
6	7	24	2	0	2	0	0	0	3.43	0.29	12.00
6A	11	81	1	0	1	0	0	0	7.36	0.09	81.00
7	84	455	14	0	14	0	0	0	5.42	0.17	32.50
7A	43	293	9	0	9	0	0	0	6.81	0.21	32.56
8	9	45	0	0	0	0	0	0	5.00	0.00	*****
9	208	1460	39	0	39	0	0	0	7.02	0.19	37.44
10	68	347	10	0	9	0	1	0	5.10	0.15	34.70
11	14	71	2	0	2	0	0	0	5.07	0.14	35.50
12	105	626	20	1	19	0	0	0	5.96	0.19	31.30
13	9	42	3	0	2	1	0	0	4.67	0.33	14.00
13A	1	2	0	0	0	0	0	0	2.00	0.00	*****
14	124	730	25	3	22	0	0	0	5.89	0.20	29.20
15	55	226	12	0	12	0	0	0	4.11	0.22	18.83
15A	21	71	5	0	5	0	0	0	3.38	0.24	14.20
17	66	312	12	0	10	0	2	0	4.73	0.18	26.00
17A	106	579	13	0	13	0	0	0	5.46	0.12	44.54
18	1	3	0	0	0	0	0	0	3.00	0.00	*****
19	4	13	0	0	0	0	0	0	3.25	0.00	*****
19A	31	188	4	0	4	0	0	0	6.06	0.13	47.00
20	2	7	0	0	0	0	0	0	3.50	0.00	*****
21	109	596	12	0	12	0	0	0	5.47	0.11	49.67
21A	62	318	14	0	14	0	0	0	5.13	0.23	22.71
22	1	5	0	0	0	0	0	0	5.00	0.00	*****
23	1	6	0	0	0	0	0	0	6.00	0.00	*****
23A	1	3	0	0	0	0	0	0	3.00	0.00	*****
25	3	17	0	0	0	0	0	0	5.67	0.00	*****
25A	2	6	0	0	0	0	0	0	3.00	0.00	*****
25B	1	2	0	0	0	0	0	0	2.00	0.00	*****
26	168	797	10	0	8	0	2	0	4.74	0.06	79.70
30	1	6	0	0	0	0	0	0	6.00	0.00	*****
32	1	4	0	0	0	0	0	0	4.00	0.00	*****
34	1	5	0	0	0	0	0	0	5.00	0.00	*****
35	1	2	0	0	0	0	0	0	2.00	0.00	*****
35A	3	12	1	0	1	0	0	0	4.00	0.33	12.00
36	1	12	0	0	0	0	0	0	12.00	0.00	*****
UNK	31	166	3	1	2	0	0	0	5.35	0.10	55.33
*** Total ***	1495	8284	240	7	224	3	6	0			